WE CLAIM:

1   1.   A method for the identification of a systemic autoimmune disease
2   in a test subject suspected of suffering from an otherwise unidentified systemic
3   autoimmune disease selected from the group consisting of systemic lupus erythmatosus,
4   scleroderma, Sjögren's syndrome, polymyositis, dermatomyositis, CREST, and mixed
5   connective tissue disease, said method comprising:
6   (a) analyzing a single biological sample from said test subject for the
7   presence and amounts of a plurality of autoantibodies to produce a test data set;
8   (b) comparing said test data set to a library of reference data sets, each
9   reference data set obtained from a biological sample of a reference subject known
10   to have a systemic autoimmune disease of known identity; and
11   (c) applying pattern recognition means to produce a statistically derived
12   decision indicating which systemic autoimmune disease said test subject is
13   suffering from.

1   2.   A method in accordance with claim 1 in which said test subject is
2   suffering from two systemic autoimmune diseases, and step (c) comprises applying
3   pattern recognition means to produce a statistically derived decision indicating which two
4   systemic autoimmune diseases said test subject is suffering from.

1   3.   A method in accordance with claim 1 in which said pattern
2   recognition means is a member selected from the group consisting of k-nearest neighbor
3   analysis, multi-linear regression analysis, Bayesian probabilistic reasoning, neural
4   network analysis, and principal component analysis.

1   4.   A method in accordance with claim 1 in which said pattern
2   recognition means is a k-nearest neighbor analysis.

1   5.   A method in accordance with claim 1 in which said plurality of
2   autoantibodies numbers from 10 to 100 autoantibodies.

          6.   A method in accordance with claim 1 in which said plurality of
2   autoantibodies numbers from 15 to 25 autoantibodies.

1   7.   A method in accordance with claim 1 in which said plurality of
2   autoantibodies comprises antibodies to at least fifteen of the following antigens:

3	SSA 60
4	SSA 60
5	SSA 52
6	SSB 48
7	Sm BB'
8	Sm D1
9	RNP 68
10	RNP A
11	RNP C
12	Fibrillarin
13	Riboproteins P0, P1, and P2
14	dsDNA
15	Nucleosome
16	Ku
17	Centromere A
18	Centromere B
19	Scl-70
20	Pm-Scl
21	RNA-Polymerases 1, 2, and 3
22	Th
23	Jo-1
24	Mi-2
25	PL7
26	PL12
27	SRP

1   **8.**   A method in accordance with claim **1** in which said plurality of

2   autoantibodies comprises antibodies to each of the following antigens:

3	SSA 60
4	SSA 60
5	SSA 52
6	SSB 48
7	Sm BB'
8	Sm D1

9	RNP 68
10	RNP A
11	RNP C
12	Fibrillarin
13	Riboproteins P0, P1, and P2
14	dsDNA
15	Nucleosome
16	Ku
17	Centromere A
18	Centromere B
19	Scl-70
20	Pm-Scl
21	RNA-Polymerases 1, 2, and 3
22	Th
23	Jo-1
24	Mi-2
25	PL7
26	PL12
27	SRP

9. A method in accordance with claim **1** in which said library of reference data sets represents from 100 to 10,000 biological samples from reference subjects known to have systemic autoimmune diseases of known identity.

10. A method in accordance with claim **1** in which said library of reference data sets represents from 200 to 2000 biological samples from reference subjects known to have systemic autoimmune diseases of known identity.

11. A method in accordance with claim **1** in which step (c) further comprises assigning a confidence level to said determination.

12. A method in accordance with claim **1** in which said biological sample from said test subject is a member selected from the group consisting of serum, plasma, urine, and cerebrospinal fluid.

1   **13.**   A method in accordance with claim **1** in which said biological

2   sample from said test subject is serum.

1   **14.**   A method in accordance with claim **1** in which step (a) is

2   performed by immunoassay.

1   **15.**   A method in accordance with claim **1** in which step (a) is

2   performed by immunoassay with fluorescence detection.

1   **16.**   A method in accordance with claim **1** in which said systemic

2   autoimmune disease is systemic lupus erythmatosus.

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